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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/683,888	02/27/2002	David M. Hoffman	GEMS8081.097	7804

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EXAMINER	
HO, ALLEN C	
ART UNIT	PAPER NUMBER
2882	

DATE MAILED: 04/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/683,888	HOFFMAN, DAVID M
	Examiner	Art Unit
	Allen C. Ho	2882

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 15 January 2003.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1,2,4-25 and 28-31 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1,2,4-25 and 28-31 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 27 February 2002 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____
4) ☐ Interview Summary (PTO-413) Paper No(s) _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, polyhedron fiber optic scintillator and polyhedron photodiode must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, a photodiode coupled to the scintillator generally perpendicular to both the first and the second directions must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. Claims 23-25 are rejected under 35 U.S.C. 102(e) as being anticipated by Gross *et al.* (U. S. Patent No. 6,310,352).

With regard to claim 23, Gross *et al.* disclosed a method of manufacturing a fiber optic scintillator cell having optical gain, the method comprising the steps of: fashioning a first component of scintillating material (BGO); fashioning a second component of optically stimulated material (laser-active rare-earth metal ion); and intermixing the first component and the second component in a single composite structure (Fig. 4).

With regard to claim 24, Gross *et al.* disclosed the method of claim 23, wherein the second component comprises optically stimulated material capable of emitting light having an intensity exceeding an intensity of light output by the first component (optical amplification).

With regard to claim 25, Gross *et al.* disclosed the method of claim 23, further comprising the step of configuring the second component of optically stimulated material from a material capable of being charged to an excited state by laser (laser active).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1, 2, and 4-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gross *et al.* (U. S. Patent No. 6,310,352 B1).

With regard to claim 1, Gross *et al.* disclosed a fiber optic scintillator cell comprising: a first component (**2**) formed of scintillating material; and a second component formed of optically stimulated material (**1**).

However, Gross *et al.* did not teach that the first component and the second component are arranged in a discretely layered stack.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a fiber optic scintillator cell formed of the first component and the second component in discretely layered stack, since a person would be motivated to provide the first component and the second component in any shape and size as long as the scintillation light produced by the first component reaches the second component and the amplification of the scintillation light is achieved and detected; it is simply a design choice.

With regard to claim 2, Gross *et al.* disclosed the fiber optic scintillator cell of claim 1, wherein the first component and the second component are intermixed with one another forming a single composite structure (Fig. 4)

With regard to claim 4, Gross *et al.* disclosed the fiber optic scintillator cell of claim 1, wherein the optically stimulated material comprises material chargeable to an excited state (column 4, lines 39-41).

With regard to claim 5, Gross *et al.* disclosed the fiber optic scintillator cell of claim 4 wherein the scintillating material comprises material capable of absorbing electromagnetic energy (x-ray) and outputting optical emissions in response thereto (inherent) and wherein the optical emissions cause the second component to output a signal having an intensity exceeding an intensity of the optical emissions received from the first component (optical amplification).

With regard to claim 6, Gross *et al.* disclosed the fiber optic scintillator cell of claim 5 wherein the optical emissions output from the first component and received by the second component causes a cascading of multiple emissions (population inversion in a laser-active material) from the optically stimulated material.

With regard to claim 7, Gross *et al.* disclosed the fiber optic scintillator cell of claim 1, incorporated into a computed tomography medical imaging diagnostic device (column 1, line 20).

With regard to claim 8, Gross *et al.* disclosed the fiber optic scintillator cell of claim 1 incorporated into a non-invasive baggage inspection device (a CT for inspecting baggages).

7. Claims 9-14 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gross *et al.* (U. S. Patent No. 6,310,352 B1).

With regard to claim 9, Gross *et al.* disclosed a detector for a computed tomography system, the detector comprising: a fiber optic scintillator configured to receive high frequency electromagnetic energy (x-ray) from a first direction having a first intensity and further

configured to output light energy in a second direction having a second intensity, wherein the second intensity exceeds the first intensity (optical amplification); and a photodiode (column 8, lines 14-15) coupled to the scintillator and configured to detect light energy output from the fiber optic scintillator.

However, Gross *et al.* did not teach that the second direction is generally parallel to the first direction and the photodiode is coupled to the scintillator generally perpendicular to both the first and the second directions.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a fiber optic scintillator in a configuration where the second direction is generally parallel to the first direction and the photodiode is coupled to the scintillator generally perpendicular to both the first and the second directions, since a person would be motivated to provide a configuration of a fiber optic scintillator to suit the engineering requirements as long as the scintillation light produced by the first component reaches the second component and the amplification of the scintillation light is achieved and detected; it is simply a design choice.

With regard to claim 10, Gross *et al.* disclosed the detector of claim 9, wherein the fiber optic scintillator comprises a mixture of scintillating material and optically stimulated material (Fig. 4).

With regard to claim 11, Gross *et al.* disclosed the detector of claim 9, wherein the fiber optic scintillator comprises a scintillator material (**2**) and an optically stimulated material (**1**) coupled to the scintillating material.

However, Gross *et al.* did not teach that the scintillating material and the optically stimulated material are arranged in a discretely layered stack.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a fiber optic scintillator formed of the scintillating material and the optically stimulated material in discretely layered stack, since a person would be motivated to provide the scintillating material and the optically stimulated material in any shape and size as long as the scintillation light produced by the scintillating material reaches the optically stimulated material and the amplification of the scintillation light is achieved and detected; it is simply a design choice.

With regard to claim 12, Gross *et al.* disclosed the detector of claim 11, wherein the layer of scintillating material is oriented to receive the high frequency electromagnetic energy (inherent) and the layer of optically stimulated material is coupled to the photodiode (column 8, lines 14-15).

With regard to claim 13, Gross *et al.* disclosed the detector of claim 9, wherein the fiber optic scintillator has light intensity greater than that of a scintillator without built-in gain (inherent).

With regard to claim 14, Gross *et al.* disclosed the detector of claim 9, incorporated into at least one of a computed tomography medical imaging device and a computed tomography baggage handling device (column 1, line 20).

With regard to claim 31, Gross *et al.* disclosed the detector of claim 9, comprising a fiber optic scintillator and a photodiode.

However, Gross *et al.* did not teach that the fiber optic scintillator and the photodiode are each a polyhedron.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a detector wherein the fiber optic scintillator and the photodiode are each a polyhedron, since a person would be motivated to provide the fiber optic scintillator and the photodiode in any shape and size as long as the amplified scintillation light produced by the fiber optic scintillator is detected by the photodiode; it is simply a design choice.

8. Claims 15, 16, and 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffman (U. S. Patent No. 6,115,448) in view of Gross *et al.* (U. S. Patent No. 6,310,352 B1).

With regard to claim 15, Hoffman disclosed a CT system comprising: a rotatable gantry **(12)** having an opening **(48)** to receive an object to be scanned; a high frequency electromagnetic energy projection source **(14)** configured to project a high frequency electromagnetic energy beam toward the object; a scintillator array **(56)** having a plurality of scintillator cells, wherein each cell is configured to detect high frequency electromagnetic energy passing through the object; a photodiode array **(60)** optically coupled to the scintillator array and comprising a plurality of photodiodes configured to detect light output from a corresponding scintillator cell, wherein each photodiode outputs a signal indicative of the light output of the corresponding scintillator cell; a data acquisition system (DAS) **(32)** connected to the photodiode array and configured to receive the photodiode outputs; and an image reconstructor **(34)** connected to the DAS and configured to reconstruct a CT image of the object from the photodiode outputs received by the DAS.

However, Hoffman did not teach that the scintillator cell is configured to output light energy having an intensity exceeding an intensity of the high frequency electromagnetic energy detected by the cell.

Gross *et al.* disclosed a scintillator cell comprising a scintillating material and an optically stimulated material, consequently this scintillator cell produces light energy having an intensity exceeding an intensity of the high frequency electromagnetic energy detected by the scintillator cell. Furthermore, Gross *et al.* taught that a scintillator cell having a built-in optical amplifier is inherently superior to a scintillator cell employing an electronic amplifier because it has a better signal-to-noise ratio (column 2, lines 30-32).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employ an array of scintillator cells disclosed by Gross *et al.* in a CT system, since a person would be motivated to increase the signal-to-noise ratio in order to produce an image that has less noise.

With regard to claim 16, Hoffman and Gross *et al.* disclosed the CT system of claim 15, further comprising a movable table (inherent) configured to pass the object through the opening, and wherein the object is a medical patient (**22**).

With regard to claim 19, Hoffman and Gross *et al.* disclosed the CT system of claim 15, wherein each scintillator cell comprises a first component of scintillating material and a second component of optically stimulated material, the optically stimulated material including material that may be changed to an excited state by a laser (laser active).

With regard to claim 20, Hoffman and Gross *et al.* disclosed the CT system of claim 19, wherein the scintillating material includes material capable of triggering a cascading of emissions (population inversion in a laser-active material) in the second component.

With regard to claim 21, Hoffman and Gross *et al.* disclosed the CT system of claim 19, wherein the first component and the second component are intermixed with one another forming a single composite structure (Fig. 4 in Gross *et al.*).

With regard to claim 22, Hoffman and Gross *et al.* disclosed the CT system of claim 19, comprising a first component and a second component.

However, these references do not teach that the scintillator comprises a layer of the first component and a layer of the second component coupled to the layer of the first component.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a scintillator formed of a layer of the first component and a layer of the second component coupled to the layer of the first component, since a person would be motivated to provide the first component and the second component in any shape and size as long as the scintillation light produced by the first component reaches the second component and the amplification of the scintillation light is achieved and detected; it is simply a design choice.

9. Claims 15, 17, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Crawford *et al.* (U. S. Patent No. 5,901,198) in view of Gross *et al.* (U. S. Patent No. 6,310,352).

With regard to claim 15, Crawford *et al.* disclosed a CT system comprising: a rotatable gantry (**124**) having an opening (**126**) to receive an object to be scanned; a high frequency electromagnetic energy projection source (**128**) configured to project a high frequency electromagnetic energy beam (**132**) toward the object; a scintillator array (**130**) having a plurality

of scintillator cells, wherein each cell is configured to detect high frequency electromagnetic energy passing through the object; a photodiode array (**130**) optically coupled to the scintillator array and comprising a plurality of photodiodes configured to detect light output from a corresponding scintillator cell, wherein each photodiode outputs a signal indicative of the light output of the corresponding scintillator cell; a data acquisition system (DAS) (**134**) connected to the photodiode array and configured to receive the photodiode outputs, and an image reconstructor (**515**) connected to the DAS and configured to reconstruct a CT image of the object from the photodiode outputs received by the DAS.

However, Crawford *et al.* did not teach that the scintillator cell is configured to output light energy having an intensity exceeding an intensity of the high frequency electromagnetic energy detected by the cell.

Gross *et al.* disclosed a scintillator cell comprising a scintillating material and an optically stimulated material, consequently this scintillator cell produces light energy having an intensity exceeding an intensity of the high frequency electromagnetic energy detected by the scintillator cell. Furthermore, Gross *et al.* taught that a scintillator cell having a built-in optical amplifier is inherently superior to a scintillator cell employing an electronic amplifier because it has a better signal-to-noise ratio (column 2, lines 30-32).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employ an array of scintillator cells disclosed by Gross *et al.* in a CT system, since a person would be motivated to increase the signal-to-noise ratio in order to produce an image that has less noise.

With regard to claim 17, Crawford *et al.* and Gross *et al.* disclosed the CT system of claim 15, further comprising a conveyor system (**122**) configured to pass the object through the opening, and wherein the object is one of a package and a piece of baggage.

With regard to claim 18, Crawford *et al.* and Gross *et al.* disclosed the CT system of claim 17, incorporated into at least one of a mail sorting facility and a baggage handling facility.

10. Claims 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffman (U. S. Patent No. 6,115,448) in view of Gross *et al.* (U. S. Patent No. 6,310,352 B1)

With regard to claim 28, Hoffman disclosed a detector for a CT system, the detector comprising: a pixilated array of scintillation elements (**56**) arranged to receive x-rays emitted from an x-ray emitter (**14**) toward a subject to be scanned; and a pixilated array of photodiodes (**60**) coupled to receive light emissions from the pixilated array of scintillation elements such that each photodiode is configured to output a signal indicative of an intensity of light emitted by a corresponding scintillation element to a decoder.

However, Hoffman did not teach that each scintillation element includes a first component formed of scintillating material and a second component formed of optically stimulated material.

Gross *et al.* disclosed a scintillation element comprising a first component (**2**) formed of scintillating material and a second component (**1**) formed of optically stimulated material, consequently this scintillation element produces light energy having an intensity exceeding an intensity of the high frequency electromagnetic energy detected by the scintillator cell. Furthermore, Gross *et al.* taught that a scintillation element having a built-in optical amplifier is

inherently superior to a scintillation element employing an electronic amplifier because it has a better signal-to-noise ratio (column 2, lines 30-32).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employ an array of scintillation elements disclosed by Gross *et al.* in a CT system, since a person would be motivated to increase the signal-to-noise ratio in order to produce an image that has less noise.

With regard to claim 29, Hoffman and Gross *et al.* disclosed the detector of claim 28, wherein the scintillating material comprises material capable of absorbing electromagnetic energy and outputting optical emissions in response thereto (inherent), and wherein the optical emissions cause the second component to output a signal having an intensity exceeding an intensity of the optical emissions received by the first component (optical amplification).

With regard to claim 30, Hoffman and Gross *et al.* disclosed the detector of claim 29, wherein the optical emissions output from the first component and received by the second component causes a cascading of multiple emissions (population inversion in a laser-active material) from the optically stimulated material.

Response to Arguments

11. Rejection of claim 1based on Hoffman *et al.* has been withdrawn, because this reference fails to teach a second component formed of optically stimulated material.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen C. Ho whose telephone number is (703) 308-6189. The examiner can normally be reached on Monday - Friday from 8:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached at (703) 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0530.

Allen C. Ho
Examiner
Art Unit 2882

ACH
April 5, 2003

David V. Bruce

DAVID V. BRUCE
PRIMARY EXAMINER